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INNOCENT COLON BACILLI IN URINES.

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NEW YORK.

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INNOCENT COLON BACILLI IN URINES.*

By ANTHONY BASSLER, M. D.,

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In the ardent search for the cardinal signs of a disease, and in the still present tendency in medicine of binding ourselves by an obsolescent system of classification and by an inadequate terminology, difficulty is encountered in seeing things of worth in other fields than our own, even when these pertain to conditions in which we are the most interested. The time-honored classifications, based upon clinical observation aided by morbid anatomy, are breaking ground for those which have their foundations in bacteriology and ampler pathology. This broadening and unifying tendency will not make for the destruction of the specialties, as some believe, but for better specialists, and it is possible that a new type of medical men known as diagnostitians will be necessary to help them.

Of late years the medical literature of the country has so thoroughly presented the importance of *B. coli communis* in connection with inflammatory and infectious conditions in the urinary tract, that one is inclined to assume that a urine containing many of them has a stern pathological importance of genitourinary interest. That such a urine commonly does have this pathological importance there

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is no question, but to show that it does not always have it is the purpose of this paper. It is stated that there are three modes of infection by which bacteria can gain the urinary canal: (1) ascending infection by the path of the urethra; (2) descending or hematogenous infection where the organisms are conveyed from a primary focus to the urinary tract and excreted by the kidney; and (3) transparietal infection through the lymphatics from the intestine to the urinary tract and bladder mostly. Since *Bacillus coli communis* is a common denizen of the intestinal tract of all mammals, it is probable that most of the coli infections of the urinray tract take place in the hematogenous way in the kidney cases and the transparietal in the cystitis. Whether a lesion in the intestine is necessary for its liberation from the gut I do not know, but there is substance for this belief in the pyelitis, septic nephritis, or cystitis occurring in the convalescence of typhoid, dysentery, or acute diarrhea; in the transitory coli hematuria that follows operations for appendicitis and other surgery upon the intestines, even to hemorrhoids. Granted that this is so, there is also good reason for the belief that bacteria under certain unknown conditions can pass through the walls of the gut and gain the body in that way. This has been proven and that it is more common than ordinarily believed the following would seem to suggest.

The largest proportion of cases that I have to deal with are those of states of chronic excessive putrefaction in the intestines. To make these diagnoses properly, detail work in the examination of the feces and urine is essential. Several months ago while examining a urine sediment with the low power and split illumination (which gives a fair degree of dark field effect) I noticed that in certain areas of the field particles on the slide were in motion. At first I thought this to be due to coursing of small amounts of urine carrying particles with them disturbing others on their way. Further observation proved that all of the specimen on the slide was stationary and that this movement was localized in certain areas. At one place I noticed a small urinary cell to be raised on one side edge up, and then drop back, perhaps being carried a short distance before it rested on the flat again. In another area amorphous matter was being pushed about in a fibrillary movement. Evidently there were present bacteria of an actively motile form doing this which the low power did not magnify enough to discern. The medium power showed the presence of many active bacilli, which were more plainly seen with the high power lens and dark field substage and arc light. With the latter instrument and an amplification of about 1,200 there were seen in this urine from four to twenty of these organisms in each field, which grown in culture and differential staining proved to be organisms of the *B. coli* class. This urine was from a female patient, so I thought that perhaps it had become infected as it was being voided from the urethra by contamination from the close-by anus, or from a chamber in which the twenty-four-hour collection of urine was being saved and in which feces had been deposited at some time before. A few days following this I examined a specimen from a male patient who collected his urine in a sterile jar and noticed the same phenomena in the sedimentary fields. Here we could exclude a close anatomical connection between the urethra and the anus, so evidently the organisms (which proved to be *B. coli* again) must have been voided in the urine. On examination of the histories, of the stool findings, and other points in the urine to confirm them, I noted that both of these urines were from cases in which a high *B. coli* content in the intestine was a definite clinical condition —that is, cases of chronic excessive intestinal putrefaction due to the *B. coli communis* as the predominant organism.

My interest being awakened in the matter, I observed sediments of each urine since then, and when I noted motile bacteria in them (providing the urine was from a male patient and had not come in contact with a bedroom chamber), I inoculated sugar tubes with a small portion of the sediment to test for *B. coli*. Altogether since then 191 fresh urines have been examined for the first time, and in these the colon bacilli in large numbers have been encountered eight times, and in smaller amounts ten times; thus the colon bacilli were present in over 9 per cent. of all urines from persons having no genitourinary symptoms. As most of these were cases of intestinal putrefaction in which one might expect this phenomenon, it is significant to observe that seven of them were not. It seems, therefore, that *B. coli* in considerable amount in urines is not uncommon in the nonputrefaction cases, although somewhat more commonly met with in them. None of these patients had any symptoms suggestive of kidney or bladder disturbance, and there were no pus cells in the urines indicating inflammation or concomitants of infection. What makes me feel that perhaps some catarrhal condition of the bladder existed in most of them was the rather high content of mucus found, but I have observed just as high contents of mucus in urines in which no infecting agents could be ascribed as probable causes, and not all of my cases showed this. It is reported that in mild *B. coli* infections of the bladder, little change can be noted in the appearance of the interior of the organ, of which the most notable lesions are congestion and swelling around the neck of the bladder and in the area of the trigone, and a possible general anemia of mucous membrane with here and there areas of congestion. But in these cases certain urinary symptoms are present to warrant the employment of a cystoscope, whereas in mine these were absent and thus its use was unnecessary and even not to be advised. All of these urines were more or less foggy looking, suggesting a bacteriuria, and very highly acid —no doubt, from products of these bacilli, which are energetic acid-makers.

We know that in systemic states supplying them, the pyogenic organisms, notably the coccal forms, and the tubercle, typhoid, and colon bacilli are found in urines. In a general way, however, it is understood that urines of normal persons are practically sterile of pathogenic organisms. The colon bacilli are not as pathogenic as the other forms mentioned, but when present in large numbers in the body outside of the intestinal tract they are considered pathogenic. While this is very possible in a general way, I feel that in so far as the bladder is concerned it is not always so, and it seems that pus must be present with them to consider it as such. There are apparently normal individuals whose bladders are incubators, and whose urines are the media for the proliferation of *B. coli* which does not seem to do any harm to them, and the presence of which need not concern us very much. In the constituents of normal urines there are carbon, nitrogen, hydrogen, and salts in solution for their growth and proliferation, and, not requiring oxygen, they grow, utilizing these products to sustain themselves. While urine is far from a perfect culture medium to grow *B. coli* in, this organism can utilize it if needs be and get along well with it when there is nothing else to have and the urine is within the body. Experiments that I have made on the average normal urine inoculated with *B. coli* is that the microorganism cannot proliferate to any considerable degree. But it does to some extent, and is not destroyed by any normal urine I have yet experimented with. It is a fact that there are not a few apparently normal individuals whose daily output of urine contains not much fewer coli bacilli than their feces do, and that many more have them in lesser amounts. It is probable that the gases that these organisms must generate go into solution in the urine in the bladder. This can be further proven by placing such coli urines in fermentation tubes, when, after standing for days, although the coli bacilli are actively proliferating in them, very little gas formation is present.

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